

the Abdus Salam International Centre for Theoretical Physics (ICTP) will organize the

# **Fourth Antonio Borsellino College on Neurophysics**

**"Sensory coding - spike trains to behaviour"**

**27 September - 8 October 2004**

*Miramare, Trieste, Italy*

## **PURPOSE AND NATURE**

Even behaviours that at first glance seem terribly simple turn out to be discouragingly complex at second glance. At present we cannot come close to describing what occurs in the mammalian brain to produce simple behaviours! For many years cognitive operations such as sensation, perception, comparing percepts to stored models (short-term and long-term memory), decision-making, and planning of actions were treated by most neuroscientists as separate areas of research. Integrative approaches - spike trains to behaviour - are now being used by some of the leading cognitive neuroscience laboratories, and the time seems ripe to organize a course to present the state of the art to neuroscience students. The idea of the course is to encourage participants to interact with researchers from disciplines ranging across the neurosciences (for example neurophysiology, neural modelling, linguistics and functional imaging) to discuss how the brain uses sensory information to develop and decide upon the appropriate action, and how the brain determines the appropriate action to optimize the collection of new sensory information. Taking this theme, we will present lectures addressing the following questions: how are percepts built up in cortex, how are judgements of the percept made? In what way does information flow within and between cortical regions, and what is accomplished by successive (and reverberating) stages of processing? How are decisions made about the percept subsequently acted upon, through their conversion to a response according to the learned criterion for action? How does the predicted or expected sensation interact with the actual incoming flow of sensory signals? The underlying theme in addressing these questions is the necessity to understand sensory-motor loops - that is, the fact that our perception of the world drives new actions, and the actions undertaken at any moment lead to a new "view" of the world.

## **PROGRAMME**

Four lectures will be presented each day, embedded within ample discussion periods. At least one day will also be dedicated to poster and slide presentations by the College participants.

## **PARTICIPATION**

The College should be of interest to researchers from many fields of neuroscience, including psychology, neurophysiology, computational biology, and theoretical modelling. Applicants should have a good basic knowledge concerning brain organization and function. Scientists and students from all countries which are members of the United Nations, UNESCO or IAEA may attend the College. As it will be conducted in English, participants should have an adequate working knowledge of this language. Although the main purpose of the Centre is to help research workers from developing countries, through a programme of training activities within a framework of international cooperation, a limited number of students and post-doctoral scientists from developed countries are also welcome to attend. As a rule, travel and subsistence expenses of the participants should be borne by the home institution. Every effort should be made by candidates to secure support for their fare (or at least half-fare). However, limited funds are available for some participants who are nationals of, and working in, a developing country, and who are not more than 45 years old. Such support is available only for those who attend the entire activity. In addition, up to 10 scholarships may be awarded by SISSA to outstanding applicants from the EU. There is no registration fee.

The **Application Form** is obtainable from the ICTP WWW server: <http://agenda.ictp.trieste.it/agenda/current/fullAgenda.php?email=0&ida=a0364> (which will be constantly up-dated) or from the activity Secretariat. It should be completed and returned before **10 May 2004** to:

*Fourth Antonio Borsellino College on Neurophysics  
(smr 1583) (c/o Ms. Ave Lusenti)  
the Abdus Salam International Centre for Theoretical Physics  
Strada Costiera 11, 34014 Trieste, Italy.*

*or*

*[smr1583@ictp.trieste.it](mailto:smr1583@ictp.trieste.it) (please save and send file attachments in RTF format)*

Applicants who do not request financial support may apply up to 10 June 2004.

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**E-mail: [smr1583@ictp.trieste.it](mailto:smr1583@ictp.trieste.it)**  
**ICTP Home Page: <http://www.ictp.trieste.it/>**

## **DIRECTORS**

**Mathew E. Diamond**  
(SISSA, Trieste, Italy)

**Leah Krubitzer**  
(Un. of California, Davis, USA).

## **INVITED LECTURERS** (to be confirmed)

**Ehud Ahissar**  
**Thomas Albright**  
**Shabtai Barash**  
**William Bialek**  
**Luca Bonatti**  
**Michael Brecht**  
**Mathew Diamond**  
**Jon Driver**  
**Patrick Haggard**  
**Justin Harris**  
**David Kleinfeld**  
**Eileen Kowler**  
**Leah Krubitzer**  
**Jacques Mehler**  
**William Newsome**  
**Bruno Olshausen**  
**Giacomo Rizzolatti**  
**Ranulfo Romo**  
**Raffaella Rumiati**  
**Jeffrey Schall**  
**Steve Scott**  
**David Sparks**  
**Alessandro Treves**  
**Daniel Wolpert**

## **DEADLINE**

**for requesting participation**

**10 May 2004**

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financial support may apply up to  
10 June 2004

